

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): ~~Process to make~~ A method of making an emitter (10; 13) for light sources comprising:

~~which can be led to incandescence through the passage of electric current, characterized in that a layer made of anodized porous alumina (1) is used~~ using as a sacrificial element for the structuring of at least a part of the emitter (10; 13) a layer made of anodized porous alumina;

wherein said emitter can be led to incandescence through the passage of electric current.

2. (currently amended): ~~Process~~ The method according to claim 1, ~~characterized in that~~ wherein said structuring ~~consists in~~ comprises obtaining at least one of ~~between~~
 - a plurality of nanometric reliefs (12) arranged according to a ~~basically~~ predefined geometry on at least a surface of the emitter (10), and
 - a plurality of nanometric cavities (15) arranged according to a ~~basically~~ predefined geometry within the emitter (13).

3. (currently amended): ~~Process~~ The method according to claim 2, ~~characterized in that~~ wherein the alumina layer (2) is obtained through consecutive anodizations of an aluminum film (6) deposited onto a surface of a corresponding substrate (2) until a regular alumina structure is obtained, which defines a plurality of pores (4) ~~basically~~ substantially perpendicular

to said surface of the substrate ~~(2)~~ the alumina layer ~~(2)~~ having a non-porous portion ~~(5)~~ close to the respective substrate ~~(2)~~.

4. (currently amended): ~~Process~~ The method according to claim 3, ~~characterized in that wherein~~ the alumina layer ~~(1)~~ is used either as a sacrificial template during said structuring or as an intermediate template for obtaining a further sacrificial template ~~(10A)~~ for said structuring.

5. (currently amended): ~~Process~~ The method according to claim 2, ~~characterized in that wherein~~ said structuring comprises ~~includes a step of~~ deposition of material by through evaporation, sputtering, Chemical Vapor Deposition, screen printing or electrodeposition.

6. (currently amended): ~~Process~~ The method according to claim 2, ~~characterized in that wherein~~ said structuring comprises ~~includes an~~ etching-step.

7. (currently amended): ~~Process~~ The method according to claim 2, ~~characterized in that wherein~~ said structuring comprises ~~includes a step of~~ anodization of a metal underlying the alumina layer ~~(1)~~.

8. (currently amended): ~~Process~~ The method according to claim 4, ~~characterized in that wherein~~ said structuring comprises ~~includes the following steps:~~

- the material (20) designed to make up the desired component (10; 10A) having a plurality of reliefs (12; 12A) is deposited as a film onto the alumina layer (1), a part of said material (20) filling said pores 4), and

- the alumina layer (1) and its substrate (2) are then removed, thus obtaining the desired component (10; 10A), whose reliefs (12; 12A) ~~consist of~~ comprise the part of said material (20) which filled said pores (4).

9. (currently amended): ~~Process~~ The method according to claim 8, ~~characterized in that wherein~~ said material (20) is deposited onto the alumina layer (1) through sputtering or Chemical Vapor Deposition.

10. (currently amended): ~~Process~~ The method according to claim 4, ~~characterized in that wherein~~ said structuring comprises ~~includes the following steps:~~

- the alumina layer (2) is removed from its substrate (2) and opened at its base, removing its nonporous portion (5), conductive metal film (21) is deposited onto the alumina layer (1),

- the material (22) designed to make up a desired component (10; 10A) having a plurality of reliefs (12-12A) is electrodeposited onto the structure formed by the metal film (21) and the residual part of the alumina layer (1), a part of said material (20) filling said pores, and (4)

- the residual part of the alumina layer (1) and the metal film (21) are then removed, thus obtaining the desired component (10; 10A), whose reliefs (12; 12A) ~~consist of~~ comprise the part of said material (20) which filled said pores (4).

11. (currently amended): ~~Process~~ The method according to claim 4, ~~characterized in that wherein~~ said structuring comprises ~~includes the following steps:~~

- the material (23) designed to make up the desired component (10;10A) having a plurality of reliefs (12;12A) is deposited as a serigraphic paste onto the alumina layer (1), a part of said paste (23) filling said pores (4),
- said paste (23) is sintered, and
- the alumina layer (1) and its substrate (2) are then removed, ~~thus~~ obtaining the desired component (10;10A), whose reliefs (12;12A) ~~consist of~~ comprise the part of said material (20) which filled said pores (4).

12. (currently amended): ~~Process~~ The method according to claim 4, ~~characterized in that wherein~~ said structuring comprises ~~includes the following steps:~~

- localized parts on the non-porous portion (5) of the alumina layer (1) are removed, ~~so as~~ to open said pores (4) on their substrate (2), and
- the material (26) designed to make up a desired component (10;10A) having a plurality of reliefs (12;12A) is deposited through electrochemical methods onto the residual part of the alumina layer (1), a part of said material (26) filling said pores (4) and getting into contact with their substrate (2), and the residual part of the alumina layer (1) and its substrate (2) are then removed, ~~thus~~ obtaining the desired component (10;10A), whose reliefs (12;12A) ~~consist of~~ comprise the part of said material (20) which filled said pores (4).

13. (currently amended): ~~Process~~ The method according to claim 4, ~~characterized in that wherein the structuring comprises includes the following steps:~~

- the substrate (2) of the alumina layer (1) undergoes anodization, so as to induce a growth of the substrate (2) below said pores (4), said growth resulting in the formation of surface projections (2A) of the substrate (2), which first cause parts of the nonporous portion (5) of the alumina layer (1) to break and then keep on growing within said pores (4), and

- the alumina layer (1) is removed through selective etching, a desired component (10) having a plurality of reliefs (12) being ~~thus~~ made by the substrate (2), said surface projections (1A) ~~making up~~ comprising said reliefs (12).

14. (currently amended): ~~Process~~ The method according to claim 8, ~~characterized in that wherein~~ said desired component is said emitter (10).

15. (currently amended): ~~Process~~ The method according to claim 8, ~~characterized in that where~~ said desired component is said further template (10A).

16. (currently amended): ~~Process~~ The method according to claim 15, ~~characterized in that wherein~~ said structuring comprises ~~includes the following steps:~~

- a layer of the material (24, 25) designed to make up said emitter (13) is deposited onto said further template (10A), and said further template (10A, 13A) is removed ~~thus obtaining to~~ obtain said emitter (13).

17. (currently amended): ~~Process~~ The method according to claim 15, ~~characterized in that wherein~~ said structuring comprises ~~includes the following steps:~~

- a layer of the material designed to make up said emitter (13) is deposited onto said further template (10A, 13A), and said further template (10A, 13A) is removed ~~thus obtaining to~~ obtain said emitter (13).

18. (currently amended): ~~Process~~ The method according to claim 15, ~~characterized in that wherein~~ said structuring comprises ~~includes the following steps:~~

- a layer of the material designed to make up said emitter (13) is deposited onto said further template (10A, 13A), and said further template (10A, 13A) is removed ~~thus obtaining to~~ obtain said emitter (13).

19. (currently amended): ~~Process~~ The method according to claim 16, ~~characterized in that wherein~~ the material (24) designed to make up said emitter (13) is deposited onto said further template (10A, 13A) through sputtering or Chemical Vapor Deposition, and ~~in that~~ said further template (10A, 13A) is removed through selective etching.

20. (currently amended): ~~Process~~ The method according to claim 16, ~~characterized in that wherein~~ the material (24, 25) designed to make up said emitter (13) is in the form of a serigraphic paste (25), which is sintered after being deposited onto said further template (10A, 13A) the latter being then removed through selective etching.

21. (currently amended): ~~Process~~ The method according to claim 5, ~~characterized in that wherein~~ said structuring comprises ~~includes the following steps:~~

- at least a part of the non-porous portion (5) of the alumina layer (1) is removed, said pores (4) being ~~thus~~ opened on their substrate (2),
- the substrate is selectively dug in the corresponding open areas on said pores (4), and
- the residual part of the alumina layer (1) is removed, the substrate ~~thus making up~~ comprising said emitter (13), the dug areas of the substrate (2) ~~making up~~ comprising said cavities (15).

22. (currently amended): ~~Process~~ The method according to claim 21, ~~characterized in that wherein~~ the substrate (2) is dug on said open areas through Reactive Ion Etching or selective wet etching or electrochemical etching.

23. (currently amended): An emitter ~~Emitter~~ for light sources, in particular a filament, which can be led to incandescence through the passage of electric current obtained with the ~~process~~ method according to claim 1 the emitter ~~having~~ comprising at least one of ~~between~~

- a plurality of nanometric reliefs (12) arranged according to a ~~basically~~ predefined geometry on at least a surface of the emitter (10), and
- a plurality of nanometric cavities (15) arranged according to a ~~basically~~ predefined geometry within the emitter (13).

24. (currently amended): An emitter ~~Emitter~~ according to claim 23, ~~where~~ wherein said reliefs (12) ~~make-up~~ comprise an antireflection microstructure, in order to maximize electromagnetic emission from emitter (12) into visible spectrum.

25. (currently amended): An emitter ~~Emitter~~ according to claim 23, ~~where~~ wherein said cavities (15) are part of a photon crystal structure.

26. (currently amended): Use of anodized porous alumina (1) as a sacrificial element for the structuring of at least a part of an emitter (10; 13) for light sources, which can be led to incandescence through the passage of electric current.

27. (currently amended): Use according to claim 26, ~~where~~ wherein alumina (1) is used as template during said structuring.

28. (currently amended): Use according to claim 26, ~~where~~ wherein alumina (1) is used as template for obtaining a further template (10A, 13A) used during said structuring.

29. (currently amended): Use according to claim 26, ~~where~~ wherein said structuring ~~allows to~~ comprises obtaining ~~obtain~~ at least one of ~~between~~

- a plurality of nanometric reliefs (12) arranged according to a ~~basically~~ predefined geometry on at least a surface of the emitter (10),

AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. APPLN. NO.: 10/523,214

ATTY MATTER NO.: Q85361

- a plurality of nanometric cavities (~~15~~) arranged according to a ~~basically~~ predefined geometry within the emitter (~~13~~).